PART NO. 3911-M20
Issue 4, March 1980

OPERATING MANUAL
MODEL 3911
IMPULSE NOISE MODULE

Manufactured by
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1. GENERAL

1.01 This manual contains information for operating the Model 3911 IMPULSE NOISE plug-in module in conjunction with the Model 3900 COMMUNICATIONS TEST SYSTEM Basic Unit. This section contains a description and specifications for the Model 3911. Figure 1 shows the front panel.

Figure 1. Model 3911 IMPULSE NOISE Module

A. Functional Description

1.02 The Model 3911 module is designed to meet Bell System standards per Bell System Technical Reference PUB 41009 dated May 1975. The module measures the number of times impulse noise (defined as any excursion of a band-limited signal above a preset threshold) occurs within a specified time period. The Model 3911 is calibrated in dBrn to read peak value of the received signal. Switch selectable Bell standard (7 counts/sec.) and channel-limited (125 counts/sec.) counting rates are provided. Two sets of thumbwheel switches allow setting of low thresholds for both impulse noise (metallic) and impulse noise-to-ground (longitudinal) tests. The Low threshold is adjustable in 1 dB steps from +30 dBrn to +109 dBrn for metallic impulse noise, and from +60 to +139 dBrn for longitudinal impulse noise. The Mid and Hi thresholds are set using the SPREAD (DB) switch which selects the spread from Low to Mid and from Mid to Hi thresholds to be 2, 4, 6, 8 or 10 dB.

B. Specifications

1.03 Specifications for the Model 3911 are contained in Table A.

TABLE A. MODEL 3911 SPECIFICATIONS *

OPERATING MODES	Noise (metallic) Noise-to-ground (longitudinal)
NOISE MEASUREMENT	
Measurement Range	+30 dBrn to +110 dBrn
Low Threshold Settings	+30 dBrn to +109 dBrn
Accuracy	±1 dB
NOISE-TO-GROUND MEASUREMENT	
Measurement Range	+60 dBrn to +140 dBrn
Low Threshold Settings	+60 dBrn to +139 dBrn
Accuracy	±1.5 dB
LO/MID, MID/HIGH THRESHOLD SPREAD	2, 4, 6, 8 or 10 dB
WEIGHTING**	C-message (Psophometric) or 3 kHz flat, switchable holding tone notch and 60 Hz (50 Hz) high-pass filter.
MAXIMUM COUNTING RATE (Switch selected)	7 counts per second (Bell standard) 125 counts per second (channel limited)
COUNTING HIERARCHY	When used with Model 3913 HITS/JITTER Module, impulse noise counts are interlocked with hit and dropout occurences in accordance with Bell System specifications.
DIGITAL DISPLAYS	LO threshold totalizer M (MID) threshold totalizer HI threshold totalizer
COUNT CAPACITY	LO 9999 M (MID) 9999 HI 9999
OVERRANGE INDICATION	When count capacity is exceeded, the display continues counting and flashes
SELF-TEST	Uses Basic Unit Generator
TIMER	5 min., 15 min., or continuous, located in Basic Unit
MODULE INTERLOCKS	"Exclusive Measurement" interlock Measurement is terminated when any Basic Unit noise weighting parameter is changed

TABLE A. MODEL 3911 SPECIFICATIONS (Cont.)

INDICATORS	TONE INTERRUPT NOISE NTG Module ON
MODULE SIZE	Single-width module
MODULE WEIGHT	17 oz. (0.48 kg.)
OPTIONS	.04 Remote Control

*All stated and unstated specifications are intended to comply with Bell System standards as contained in Bell System Technical Reference PUB 41009 dated May 1975

**Specification dependent on Model 3901/3902 Basic Unit

HLI reserves the right to make changes in specifications at any time without notice.

2. OPERATING INSTRUCTIONS

2.01 This section contains the setup procedures for the Model 3911 and related set-up procedures for the Basic Unit. Features of the Model 3911 are also described.

A. Setup Procedures

2.02 Set up the Basic Unit as follows:

1) Refer to Section 4 of the Basic Unit Operating Manual (3901-M20) for line interface information.
2) Set POWER switch to in position.
3) Set ABS/REL switch to the desired position. If REL is selected, the low threshold is LOW THR setting plus REL REF setting.
4) If performing balanced-circuit impulse noise measurements, set either the REC-LEVEL or the REC-NOISE switch to in position.
5) If performing impulse noise-to-ground measurements, set REC-NTG switch to in position.
6) Set C-MSG/3 KHZ (PSOPH/3 KHZ) switch to the desired position.
7) If a holding tone is to be used, set NOTCH switch to in position. If a tone is not to be used, set NOTCH switch to out position.
8) Set 60 Hz ≈ (50 Hz ≈) switch to desired position.
9) Set the appropriate timer interval switch (5 MIN, 15 MIN or CONT) to in position.
10) Refer to Section 10 of the Basic Unit Operating Manual (3901-M20) for generator control settings.
11) Set NORM/RETURN LOSS switch to NORM.

2.03 Set up the Model 3911 as follows:

1) Momentarily press the ON/OFF switch and observe that green ON/OFF LED is on.
2) Select counting rate by setting BELL STD/CHNL LTD switch to the appropriate position.
3) Set the appropriate LOW THR thumbwheel switches for the low threshold.
4) Select the DB SPREAD between LO to M and M to HI thresholds by setting the SPREAD (DB) switch to desired spread (2, 4, 6, 8 or 10 dB).

B. Impulse Noise Measurement

2.04 To start the impulse noise measurement, proceed as follows:

1) On the Basic Unit, momentarily press the timer START/STOP switch.
2) When the selected time interval has been completed, the measurement will automatically stop and the number of impulse noise counts will be displayed on the Model 3911 display.
3) If timer interval was set to CONT, stop the timer by pressing the START/STOP switch at the conclusion of the test.
4) Turn off the Model 3911 by momentarily pressing the ON/OFF switch.

Note: Turning on another plug-in module which does not require the use of the timer on the Basic Unit may also turn off the Model 3911.

C. Features

2.05 Tone Interrupt: If the holding tone is lost during an impulse noise measurement, the red TONE INTERRUPT LED will turn on. The LED will remain on until reset by the start of a new measurement period.

2.06 Measurement Interrupt: To discourage the changing of parameters during an impulse noise measurement, the Model 3911 contains an interrupt-sensing circuit that detects certain changes. If any of the switch settings set up per Paragraph 2.02 (with the exception of REC-LEVEL and REC-NOISE switches) are changed during a measurement, the measurement will terminate and the TIMER (MINUTES) display on the Basic Unit will flash at a 1 Hz rate to indicate an interrupted measurement. Turning on the Model 3913 HITS/JITTER Module, or turning off the Model 3911 during a measurement, will also

cause an interrupted measurement condition. When a measurement has been interrupted, repeat the setup procedures.

2.07 Noise Level Measurement: The REC-LEVEL and REC-NOISE switches may be changed without interrupting the measurement. This feature permits verification of both holding tone and noise levels.

2.08 Memory: When the Model 3911 is turned back on after being turned off, the TIMER (MINUTES) display on the Basic Unit and the IMPULSE NOISE display on the Model 3911 will display the same information that was present when the Model 3911 was turned off, if power to the Basic Unit was not interrupted or the timer was not used while the Model 3911 was turned off.

2.09 Counting Heirarchy: When the Model 3911 is being used with the Model 3913 HITS/JITTER Module, any transient qualified as a dropout, a phase hit, or a gain hit will not be counted as impulse noise.

2.10 Overflow: If the number of impulse noise counts exceeds 9999 during a measurement, the overflowed counter(s) will flash to indicate an overflow condition.

2.11 Lamp Test: By activating the lamp test switch when the Model 3911 is on, all segments of the readouts and all the LED indicators can be turned on to verify proper operation of the displays.

2.12 Freeze: The freeze mode may be activated during a measurement without affecting the measurement in process. Counts accumulated during the freeze mode will be displayed as soon as the freeze is removed.

3. SELF-TEST

3.01 This section contains the procedure for self-testing the Model 3911.

3.02 Set up the Basic Unit as follows:

1) Set ABS/REL switch to ABS.
2) Set REC-NOISE switch to in position.
3) Set C-MSG/3 KHz switch to 3 KHz.
4) Set NOTCH switch to out position.
5) Set 5 MIN switch to in position.
6) Set 1004 HZ switch to in position.
7) Set QUIET TERM switch to out position.
8) Set DIAL/TK switch to out position.
9) Set BRIDGE/TERM switch to TERM.
10) Set NORM/RETURN LOSS switch to NORM.
11) Set SEND LEVEL (DBM) thumbwheel switches for +00.5 dBm.
12) Connect looping cord from the NORM-REC jack to the NORM-SEND jack.
13) Set POWER switch to in position.

3.03 Set up the Model 3911 as follows:

1) Momentarily press ON/OFF switch and observe that ON/OFF LED is on.
2) Set BELL STD/CHNL LTD switch to BELL STD.
3) Set NOISE LOW THR thumbwheel switches to 92 dBrn.
4) Set SPREAD (DB) switch to 2.

3.04 Perform self-test procedures as follows:

1) Momentarily press the timer START/STOP switch on the Basic Unit.
2) On the Model 3911, observe that the LO display is counting but that the M and HI displays are not counting.
3) Set the NOISE LOW THR thumbwheel switches to 88 dBrn and observe that the LO, M and HI displays are counting.
4) Set BELL STD/CHNL LTD switch to CHNL LTD and observe that the rate of counting on the three displays increases.
5) Set the NOTCH switch to in position and observe that the TIMER (MINUTES) display is flashing and the LO, M and HI displays have stopped counting.
6) Momentarily press the timer START/STOP switch.
7) Set QUIET TERM switch to in position and observe that the Model 3911 TONE INTERRUPT LED turns on.
8) Set QUIET TERM switch to out position and observe that TONE INTERRUPT LED remains on and the three displays are not counting.
9) Momentarily press the timer START/STOP switch and observe that the timer display is flashing.
10) Momentarily press the timer START/STOP switch and observe that the TONE INTERRUPT LED indicator goes out.

4. INSTALLATION/REMOVAL

4.01 This section describes the procedures for installation or removal of the module.

WARNING: Before module installation or removal, make sure that Basic Unit POWER switch is OFF (out position).

4.02 To install the module, proceed as follows:

1) Align the module's PC board with the guides of the Basic Unit slot, and push the module in until the extractor rod contacts the extractor standoff.
2) Turn the extractor screw clockwise while gently pushing the module into the edge connector.
3) Tighten the extractor screw until the module is firmly in place.
4) After the module has been installed, it is recommended that the self-test procedure described in Section 3 be performed to verify that the unit is electrically operational.

4.03 To remove the Model 3911, proceed as follows:

1) Turn the extractor screw counterclockwise until it turns freely.
2) Remove the module by pulling it forward.

WARNING: Handle the module only by top and bottom edges of the PC board.

3) See Paragraph 5.02 for packing and shipping. See Paragraph 5.03 for return to factory.

5. PACKING/SHIPPING, AND RETURN TO FACTORY

5.01 This section contains directions for the packaging and shipment of the module, and special instructions for identification tagging when returning the module to HLI for servicing or repair.

A. Packing and Shipping

WARNING: When the module has been extracted from the Basic Unit, handle the module by the top and bottom edges of the board only. DO NOT handle the rear edge connector. Static electricity may damage the CMOS IC's on the board(s).

5.02 Modules shipped separately from the factory are enclosed in a special conductive envelope that protects the circuitry from static electricity. This protective envelope should be retained and used for reshipment. If the conductive envelope is not available, DO NOT wrap the module in an ordinary plastic bag or plastic sheeting. Instead, proceed as follows:

Note: If the module is being returned for servicing or repair, refer to Paragraph 5.03.

1) If available, cover the entire rear edge connector with conductive shorting bar.
2) Wrap the module in heavy kraft paper.
3) Insert the wrapped module in a strong shipping container. Surround the packaged module with 2 to 4 inches (5 to 10 cm.) thick shock-absorbing material. (Common newspapers may be used.)
4) Mark the container: FRAGILE: DELICATE ELECTRONIC INSTRUMENT.

B. Return for Repair or Servicing

5.03 If the module is being returned to HLI for servicing or repair, enclose the following information:

a) Type of service or repair required
b) Model and serial number of the Basic Unit and Expander Unit from which the module was extracted.
c) Model and serial number of the module
d) Your return address

Retain a copy of all information for yourself and refer to your copy in any correspondence with HLI.